



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/554,415

10/24/2005

Thomas Sugar

09049-00004-US1

5350

30678

7590

03/09/2010

CONNOLLY BOVE LODGE & HUTZ LLP  
1875 EYE STREET, N.W.  
SUITE 1100  
WASHINGTON, DC 20006

EXAMINER

MATTER, KRISTEN CLARETTE

ART UNIT

PAPER NUMBER

3771

MAIL DATE

DELIVERY MODE

03/09/2010

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/554,415	<b>Applicant(s)</b> SUGAR ET AL.	
	<b>Examiner</b> KRISTEN C. MATTER	<b>Art Unit</b> 3771	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 10-18, 21-24 and 37-49 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10-18, 21-24 and 37-49 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                        | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

Art Unit: 3771

### **DETAILED ACTION**

This Action is in response to the Request for Continued Examination filed 2/17/2010.

Claims 10 and 11 have been amended, claims 1-8, 20, 25, and 26 have been cancelled, and claims 37-49 have been added. Thus, claims 10-18, 21-24, and 37-49 are currently pending in the instant application.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 11-18, 21-24, and 37-49 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 11-18 and 21-24 all refer to “the mechanical device,” “the shock absorber,” “the helical spring,” “the two mechanical connectors,” or “the telescoping structure” in line 1. Use of the term “the” makes the claim unclear because there are two of each of these elements already claimed (i.e., since each actuator has one of these elements and there are two actuators claimed). Examiner suggests changing “the” to --each-- to overcome the rejection. In addition, in claims 15-18, “the inner bladder” should be changed to --a respective inner bladder-- if the above suggestion is taken since there are two inner bladders as well and in claims 23-24 all instances of “the two mechanical connectors”, “the telescoping structure” and “the helical spring” (apart from that in line 1) should be changed to --a respective two mechanical connector--, --a respective telescoping structure-- and --a respective helical spring--, respectively.

Art Unit: 3771

In claim 37, lines 8-9 “the bladders of each muscle actuator are configured” is confusing because as written it seems like each actuator has more than one bladder, which is not the case. Examiner suggests changing “the bladders of each muscle actuator are configured” to --each bladder is configured--.

Like wise, claims 38-49 all refer to “the mechanical device,” “the shock absorber,” “the helical spring,” “the two mechanical connectors,” or “the telescoping structure” in line 1. Use of the term “the” makes the claim unclear because there are two of each of these elements already claimed (i.e., since each actuator has one of these elements and there are two actuators claimed). Examiner suggests changing “the” to --each-- to overcome the rejection. In addition, in claims 42-44, “the inner bladder” should be changed to --a respective inner bladder-- if the above suggestion is taken since there are two inner bladders as well and in claims 48-49 all instances of “the two mechanical connectors,” “the telescoping structure” and “the helical spring” (apart from that in line 1) should be changed to --a respective two mechanical connector--, --a respective telescoping structure-- and --a respective helical spring--, respectively.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 3771

**Claims 10-18, 21, and 37-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over McIntyre (US 2,536,454) in view of Wassam et al. (US 4,739,692, herein referred to as “Wassam”) and Erickson (US 6,067,892).**

Regarding claims 10, 14-17, 37, and 41-44, McIntyre discloses a muscle assist device comprising a knee brace/first pivot member (6, 7, and top support seen in Figure 1), a foot support/second pivot member (9) attached to the knee brace via a pivot joint (at heel of shoe), and a muscle assist device attached to opposite sides of both the knee and foot supports at a location distal from the pivot joint (see Figure 1).

McIntyre discloses a simple spring/pulley system for moving the foot and thus lacks the claimed actuator. However, McKibben-type muscle actuators are well known and commonly used in the art. In addition, Wassam discloses separately inflatable artificial muscle actuators comprising McKibben muscle actuators each having an inner bladder (14) connected at ends using a connector (13) and pressurized by a pneumatic source (17) so that the bladder expands in a radial direction (column 4, lines 25-35). The actuator includes a braided material (11) wrapped around and coupled to ends of the inner bladder (see Figure 1) such that when the bladder expands radially, the braided material contracts longitudinally (see column 4, lines 25-35). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the simple spring/pulley actuator of McIntyre with the McKibben actuators of Wassam because it would have allowed more accurate and reliable control over the movement of the foot while walking. Such a modification would involve the mere substitution of a well known method (McKibben actuators) in a well known device (brace) to yield predictable results that do not patentably distinguish an invention over the prior art. Since there are two separate

Art Unit: 3771

actuators/bladders in the modified device, it would have been obvious to configure them such that they are separately pressurizeable.

McKibben is silent as to the claimed mechanical device/helical springs (i.e., seems to be that the return of the bladder to its original length comes from actuation of a complementary actuator). However, Erickson discloses that in McKibben muscle actuators since the bladder can only retract/expand in a single direction, another external force must be supplied to return the bladder to its original position. That force can come from opposing actuators, springs, gravity, etc. (see column 8, lines 1-10). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a mechanical device that expands the bladder ends longitudinally when the inner bladder is depressurized as taught by Erickson because it would have provided the means for returning the bladder to its original length so that the actuator could be used again to create the contraction/extension. Such a modification would involve the mere substitution of a well known means (spring, etc.) in a well known device (McKibben actuator) to yield predictable results that do not patentably distinguish an invention over the prior art. Where the spring is located (i.e., inside, adjacent, over, etc.) is considered an obvious design consideration to one of ordinary skill in the art so long as it was able to return the bladder to its original depressurized length (see the balance of cited prior art for springs mounted at all of these locations).

Regarding claims 11-13 and 38-40, the modified McIntyre reference does not specifically mention shock absorbers for the mechanical devices (i.e., Erickson discloses springs, other actuators and gravity). However, shock absorbers are well known and commonly used for quick return of extensible members (see cited art and also applicant's specification paragraph 58 in

Art Unit: 3771

which shock absorbers are discussed as being prior art devices). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have replaced the spring of the modified McIntyre device with a shock absorber in order to provide a well known and commonly used means for quickly returning the extensible member to its original length and to allow more accurate control over the speed of return than capable with a spring. Furthermore, there is nothing structurally that would prevent such a modification and it appears that the modified device of McIntyre would perform equally well with a shock absorber (or any other means capable of quickly returning the member to its original length). The specific type of shock absorber (i.e., locking compression gas spring-type) is considered an obvious design consideration to one of ordinary skill in the art depending on the specific application the actuator is being used for and the needed control with extension and compression of the device.

Regarding claims 18 and 45, the modified McIntyre reference is silent as to an adjustment clamp. However, adjustment clamps are well known and commonly used with springs to allow for adjustment of tension to individualize an actuator device. Therefore, absent a critical teaching and/or showing of unexpected results from use of an adjustment clamp, examiner contends that it would have been obvious to one of ordinary skill in the art to add an adjustment clamp to the modified McIntyre device, (particularly if the spring was located adjacent or outside the bladder) in order to allow a user to set a desired tension on the spring to control the strength and speed of return to its original length. Such a modification would involve the mere use of a well known method (adjustment clamps/knobs) in a well known device (spring of an muscle actuator) to yield predictable results that do not patentably distinguish an invention over the prior art.

Art Unit: 3771

Regarding claims 21 and 46, McIntyre has the bladder connected to two mechanical connectors (13). In addition, in order for the spring to properly work and return the bladder to its original length it would have to be able to push against two mechanical components. Therefore, it would have been obvious to one of ordinary skill in the art to connected the spring of the modified McIntyre device to two mechanical connectors (either those disclosed by McIntyre or a separate connector if for example the spring as located to the side of the bladder) in order to secure the spring so that it could transmit the force needed to return the bladder to its original length.

**Claims 22-24 and 47-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over McIntyre in view of Wassam and Erickson, as applied to claims 10-18, 21, and 37-46 above, and further in view of Negishi et al. (US 5,158,005, herein referred to as "Negishi").**

Regarding claims 22 and 47, the modified McIntyre reference lacks a telescoping structure. However, Negishi discloses, in a similar air-filled actuator, two telescoping tubular shell members (22) positioned over at least a portion of a braided material and bladder and a clamping device attached to each end of a spring (column 4, lines 45-55). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided McIntyre's modified device with a telescoping structure as taught by Negishi in order to hide and protect the inner working components of the actuator. Furthermore, there is nothing structurally that would prevent the addition of a telescoping structure to McIntyre and it appears as though the device would perform equally well with a telescoping structure as taught by Negishi.



Art Unit: 3771

Regarding claims 23, 24, 48, and 49, the modified McIntyre reference is silent as to which way the springs are clamped. Examiner notes however that the spring of Negishi is clamped in a stretched position so that it is compressed when the telescoping members expand (see Figure 3a). Upon removal of the force created by the pneumatic source, the compressed spring exerts a force that more quickly returns the telescoping portions to their original position (column 4, lines 35-45). Depending on the desired application and use of the device, whether the spring is clamped in a compressed or stretched position is considered an obvious design consideration to one of ordinary skill in the art because both positions would allow the bladder to return to its original length, just via different means (i.e., if the spring is clamped in a stretched position it will push the bladder back to its original length, and if the spring is clamped in a stretched position it will pull the bladder back to its original position). Furthermore, it appears as though the modified device would perform equally well with either type of spring clamping means/position.

### ***Response to Arguments***

Applicant's arguments filed 2/17/2010 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Schmitz, Sultan, Hiramatsu, Chiel, and Greenhill are cited to show other McKesson-type muscle actuators.

Art Unit: 3771

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KRISTEN C. MATTER whose telephone number is (571)272-5270. The examiner can normally be reached on Monday - Friday 9-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Justine Yu can be reached on (571) 272-4835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kristen C. Matter/  
Examiner, Art Unit 3771